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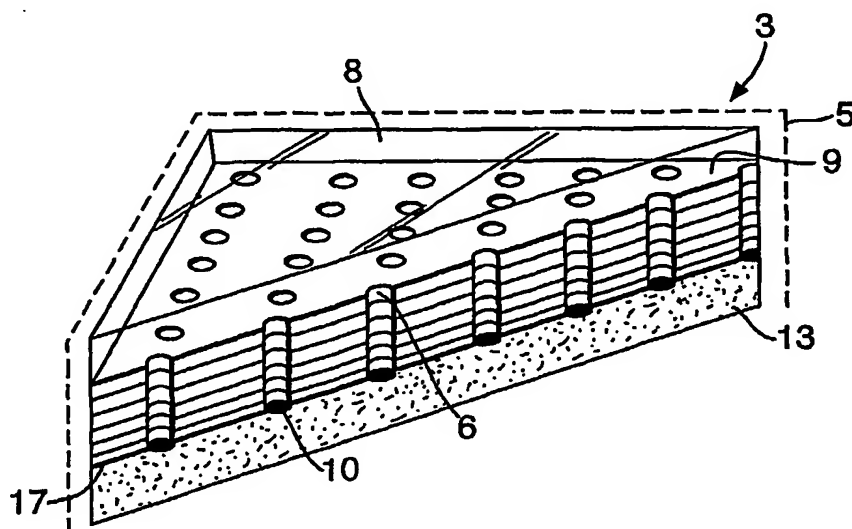
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(54) Title: **LARGE AREA DETECTORS AND DISPLAYS**



(57) Abstract: A large area detector (3) for use, for example, as an x-ray detector for medical imaging consists of a radiation sensitive detector (8) in combination with a monolithic amplification device consisting of a plurality of alternately stacked dynode and insulation layers having channels (6) extending therethrough in communication with respective signal collectors (10). The large area detector (3) is capable of being formed in tiles of 1 m² or more whilst providing high resolution of the order of 50-60 pixels per mm².



GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK,
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INTERNATIONAL SEARCH REPORT

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC, COMPENDEX, IBM-TDB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 384 519 B1 (STEINBECK JOHN ET AL) 7 May 2002 (2002-05-07)	1-7, 9-11,16, 17
Y	column 9, line 21 - column 15, line 23; column 17, line 42 - column 19, line 46; figures 1, 2, 7, 9	13,14,19
Y	DE 196 27 659 C1 (SIEMENS AG) 8 January 1998 (1998-01-08)	13,14
A	column 1, line 33 - line 68; figures	15
A	EP 1 085 556 A (HAMAMATSU PHOTONICS KK) 21 March 2001 (2001-03-21) paragraph '0057! - paragraph '0060!; figures 16,17	9,10
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4 361 384 A (BOSSERMAN DAVID A) 30 November 1982 (1982-11-30)	19
A	column 1, line 67 - column 4, line 57; figures -----	20
X	US 4 041 343 A (ORTHUBER RICHARD K) 9 August 1977 (1977-08-09) column 2, line 19 - line 66; figure 1 -----	1,6,7
X	WO 99/09577 A (COUNCIL CENT LAB RES COUNCILS) 25 February 1999 (1999-02-25) page 4, line 7 - page 5, line 28; page 7, line 18- 20; page 9, line 4 - line 21; page 10, line 22 - line 26; figure 1 -----	1,2,4-7
X	US 6 215 243 B1 (JANNING JOHN L) 10 April 2001 (2001-04-10) column 9, line 23 - line 47; column 10, line 47 - line 65; column 11, line 27 - column 14, line 26; figures 2, 4, 7 -----	16-18
A	US 5 225 820 A (CLERC JEAN-FREDERIC) 6 July 1993 (1993-07-06) abstract; figures -----	16-18
A	GB 2 293 042 A (IBM) 13 March 1996 (1996-03-13) page 8, line 5 - page 9, line 19; figures -----	15-18

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

GB2004/001439

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 6384519	B1	07-05-2002	AU WO	5098798 A 9819341 A1	22-05-1998 07-05-1998
DE 19627659	C1	08-01-1998	NONE		
EP 1085556	A	21-03-2001	JP JP AU EP US AU AU CN CN CN EP EP WO WO WO US US	11345587 A 11345588 A 3958799 A 1085556 A1 6762555 B1 3958699 A 3958899 A 1304542 T 1304543 T 1304544 T 1077470 A1 1093150 A1 9963573 A1 9963574 A1 9963575 A1 6650049 B1 6472664 B1	14-12-1999 14-12-1999 20-12-1999 21-03-2001 13-07-2004 20-12-1999 20-12-1999 18-07-2001 18-07-2001 18-07-2001 21-02-2001 18-04-2001 09-12-1999 09-12-1999 09-12-1999 18-11-2003 29-10-2002
US 4361384	A	30-11-1982	NONE		
US 4041343	A	09-08-1977	NONE		
WO 9909577	A	25-02-1999	EP WO	1004134 A1 9909577 A1	31-05-2000 25-02-1999
US 6215243	B1	10-04-2001	US US US US US US US US US US US	5982082 A 5955833 A 5949185 A 6323594 B1 6111353 A 6147456 A 6084345 A 6087766 A 6127774 A 6414442 B1	09-11-1999 21-09-1999 07-09-1999 27-11-2001 29-08-2000 14-11-2000 04-07-2000 11-07-2000 03-10-2000 02-07-2002
US 5225820	A	06-07-1993	FR CA DE DE EP JP JP KR US	2633765 A1 1319390 C 68915866 D1 68915866 T2 0349426 A1 2061949 A 2728740 B2 140536 B1 5231387 A	05-01-1990 22-06-1993 14-07-1994 05-01-1995 03-01-1990 01-03-1990 18-03-1998 01-06-1998 27-07-1993
GB 2293042	A	13-03-1996	NONE		